REMARKS/ARGUMENTS

Claims 1, 3-13 and 17-20 are pending. Claims 1, 3-8, 10-13, 17 and 18 have been rejected. Claim 1 has been amended. The amendment of Claim 1 is supported by page 6, lines 22-25. Claims 2 and 14-16 were previously canceled. Claims 9, 19 and 20 stand withdrawn from further consideration for being directed to a nonelected species.

The §103(a) Rejection

Claims 1, 3-8, 12, 13, 17 and 18 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Kobayashi (Sho58-150322), herein "Kobayashi", in view of Shiraishi et al (Hei 5-273119), herein "Shiraishi" and Asai et al., (JP 62134089), herein "Asai". Each of the cited references refers to English translations thereof.

The Office Action cites to Kobayashi for the following: (1) use of a ceramic honeycomb to fix an enzyme thereto and (2) "the walls of the honeycomb are perforated with holes on the ceramic honeycomb structure to avoid the problem of obstruction and to increase contact surface area". The Office Action recognizes that Kobayashi fails to disclose that the reactant penetrate the wall as required in Claim 1 and Claims 3-7, the porosity of the wall is at least 50% and the mean pore size is at least 5 micrometers. The Office Action cites to Asai for the pore size of 10 to 100 micrometers and porosity of the honeycomb being 50%. From this, the Office Action contends that an "ordinary artisan would have had a reasonable expectation that said average pore size and porosity ranges and would be successful in the method of the [*sic*] Kobayashi because the reactor taught by Asai has the same set up as that of Kobayashi: a ceramic honeycomb reactor having pores with microorganisms immobilized thereon."

Applicants do not disagree that the logic of combining Kobayashi and Asai is reasonable as described. Applicants point out that such combination does not read upon Claim 1, but in fact teaches away from Claim 1 as follows. Kobayashi

specifically describes adhering a gel that has a thickness of 100 to 1000 micrometers thick. The gel is solidified. (page 4, first two full paragraphs). Such a solidified gel will obstruct any pore within the ceramic honeycomb wall. Consequently, there can be no penetration of the reactant into the walls of the ceramic honeycomb as described by Asai. Further, Asai, also describes that the pores are filled. (see page 8, last full paragraph). Since Claim 1 requires that the reactant penetrate the walls of the ceramic honeycomb, the combination of Kobayashi and Asai do not read upon Claim 1, but teach away from Claim 1 (i.e., the combination teaches to adhere a catalyst layer such that the pores are filled/obstructed and consequently no penetration would occur). To make a further distinction, Claim 1 has been amended to require the mean pore size is at most 100 micrometers. For this reason, Claim 1 and its dependent Claims are nonobvious.

The Office Action cites to Shiraishi to support the use of a mullite suitable for attachment of enzymes. The Office Action recognizes that the "needle (acicular) crystals [are] in a *highly dense state*." (emphasis added) From the length and width of the needles, the Office Action contends that the aspect ratio is within the range of that in Claim 1. The Office Action then concludes that "[t]he ordinary artisan would have had a reasonable expectation that the microorganisms would be active when attached to acicular mullite having said aspect ratio . . . ."

Applicants agree that Shiraishi describes that the mullite is in a highly dense state. Shiraishi describes that the mullite in Practical Example 2 has pores that are 0.1 to 1 micrometers and that the film deposited upon them is from 10 to 100 micrometers thick. Shiraishi only describes a highly dense mullite surface and a pore size and coating thickness that clearly would obstruct any pores of the highly dense mullite layer. Consequently, just as for Kobayashi and Asai, Shiraishi fails to describe a honeycomb with enzymes or any other catalyst, where the reactant can penetrate into the walls as required in the method of Claim 1. Consequently, Claim 1 and its dependent Claims are non-obvious over Kobayashi in view of Shiraishi and/or Asai.

Claims 1, 3-8, 12, 13, 17 and 18 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Duncombe et al., (US 4,430,348), herein "Duncombe", in view of Shiraishi and Asai.

The Office Action has not pointed to anything of substantive difference in Duncombe compared to Kobayashi other than perhaps that Duncombe describes bubbling a gas through the monolith used. All of the same requirements in Claim 1 and Claims 3 though 6 are lacking in Duncombe just as for Kobayashi. For these, just as for Kobayashi, Asai and Shiraishi are relied upon. For the same reason Kobayashi combined with Asai and/or Shiraishi fail to describe the invention of Claim 1 as detailed above, Duncombe when combined with same references fail to describe the inventions of Claim 1. Consequently, Claim 1 and its dependent Claims are nonobvious.

Claims 1, 3-8, 12, 13, 17 and 18 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Asai in view of Shiraishi.

As previously described above, Asai in view of Shiraishi both describe filling or obstructing the pores of the honeycomb ceramic and as such the reactant would not penetrate the wall of the honeycomb as required in Claim 1. Thus, Claim 1 and its dependent Claims are nonobvious over these two references just as they are nonobvious over the same art sans Kobayashi or Duncombe.

Considering the foregoing reasons and amendments, Claims 1, 3-8, 10-13, 17 and 18 are patentable. Applicants, therefore, respectfully request withdrawal of all rejections and allowance of Claims 1, 3-8, 10-13, 17 and 18.

Respectfully submitted,

Electronic signature: /Kevin J. Nilsen/
Kevin J. Nilsen
Registration No. 41,510
Phone: (248) 391-6321

P. O. Box 1967
Midland, MI 48641-1967
KJN/mfm